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(54) **METHOD, SYSTEM AND COMPUTER PROGRAM PRODUCT FOR OPERATING A KEYBOARD**

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(51) **Int. Cl.**

G06F 3/023	(2006.01)
G06F 3/02	(2006.01)
G06F 3/01	(2006.01)
G06F 3/0488	(2013.01)

(52) **U.S. Cl.**

CPC ***G06F 3/02*** (2013.01); ***G06F 3/018*** (2013.01); ***G06F 3/04886*** (2013.01)

(58) **Field of Classification Search**

CPC G06F 3/048–3/04897

See application file for complete search history.

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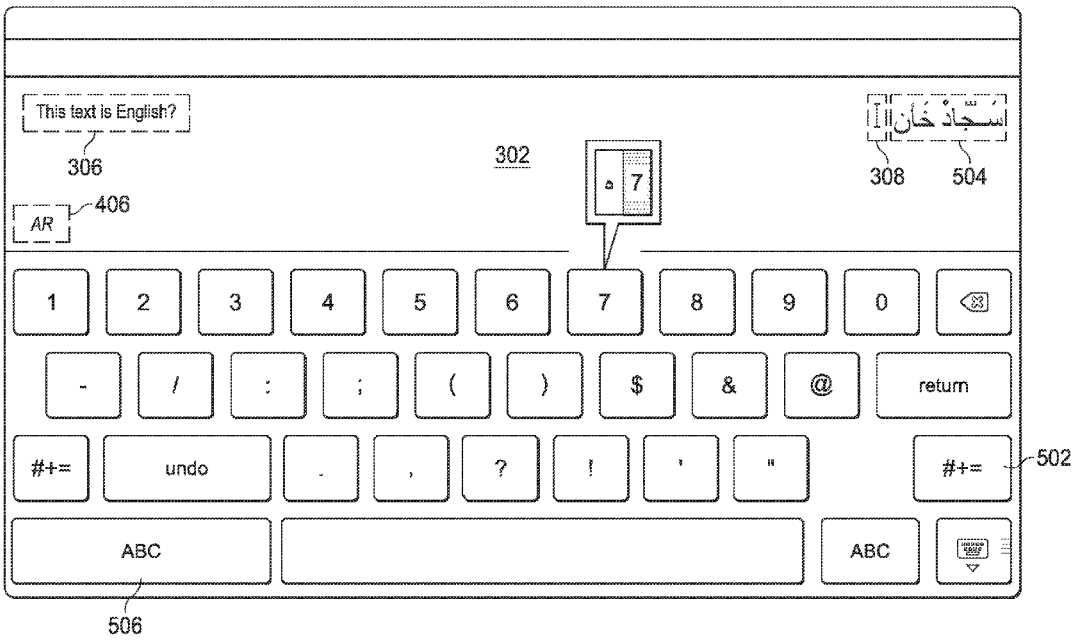
(57) **ABSTRACT**

In response to a user selecting a key on a keyboard in a first manner, a first alphanumeric character is displayed on a display device. In response to the user selecting the key on the keyboard in a second manner, a virtual key of a diacritic is displayed on the display device. In response to the user selecting the virtual key of the diacritic on the display device, the diacritic is displayed at a location of a second alphanumeric character on the display device.

14 Claims, 5 Drawing Sheets



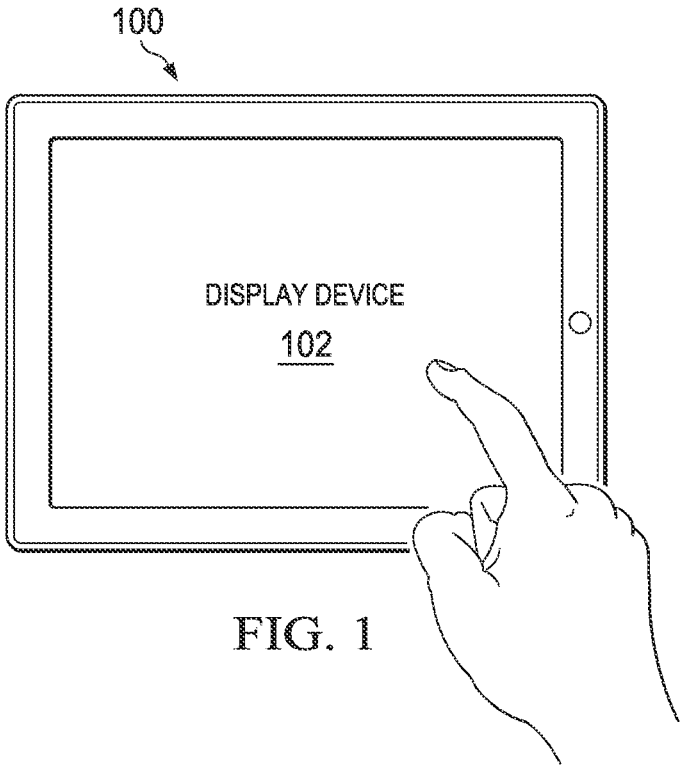

100
DISPLAY DEVICE
102

FIG. 1

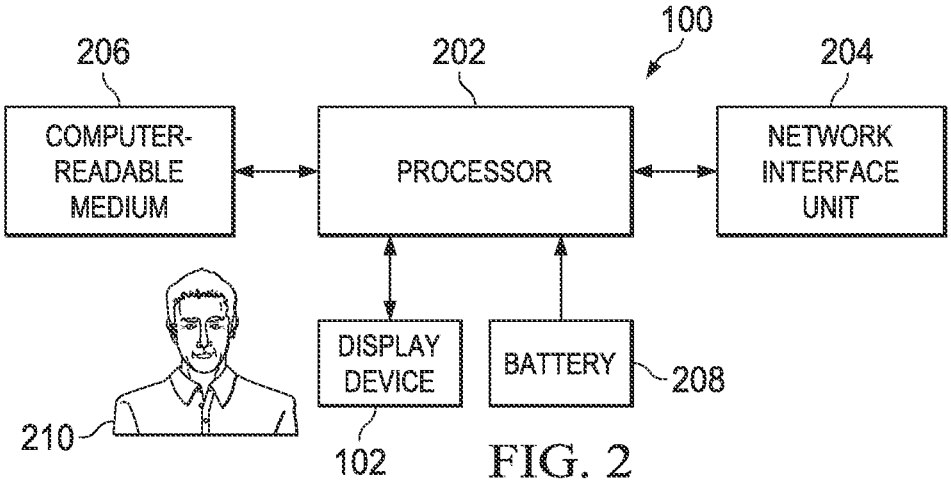

100
206
202
204
COMPUTER-READABLE MEDIUM
PROCESSOR
NETWORK INTERFACE UNIT
DISPLAY DEVICE
BATTERY
208
210
102

FIG. 2

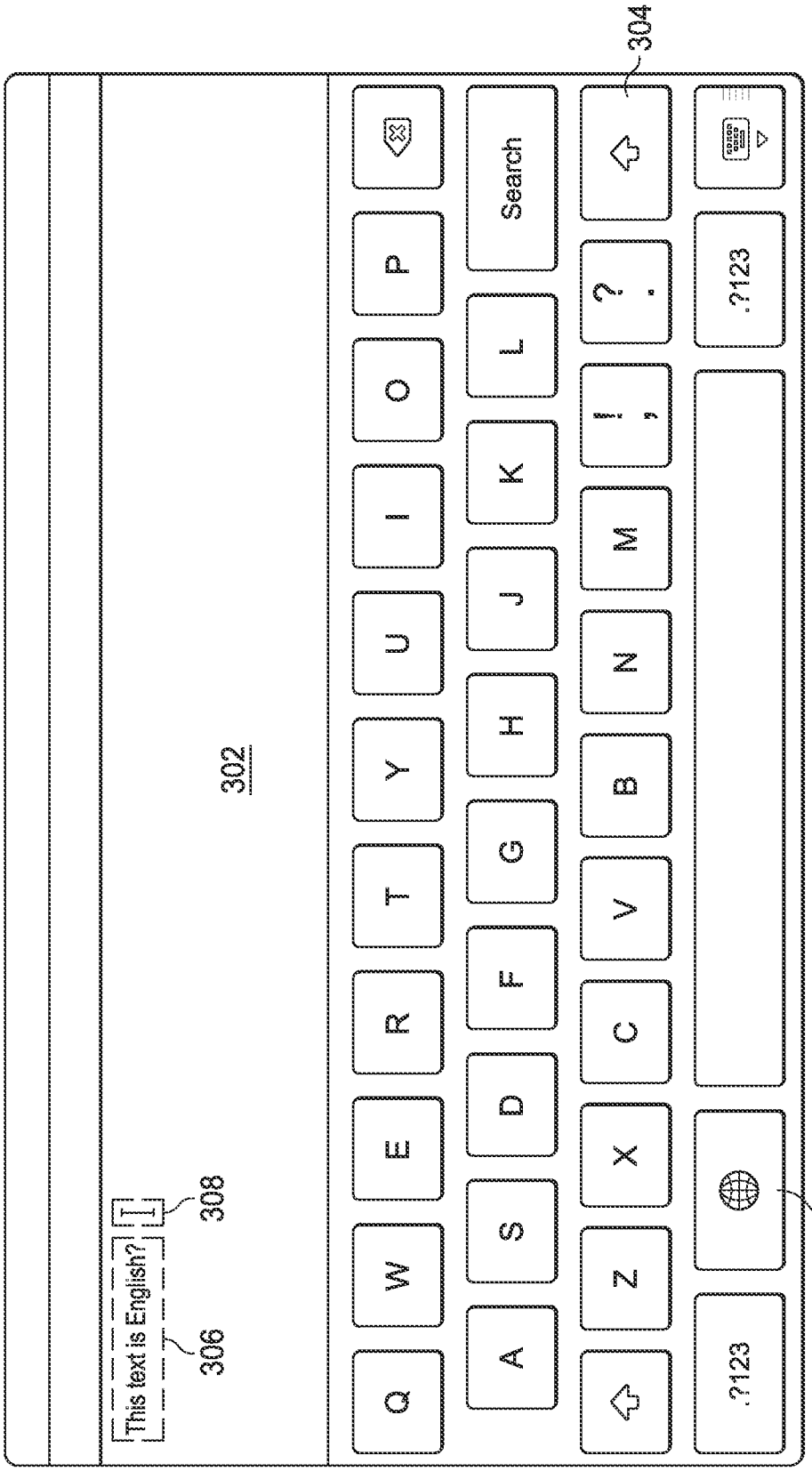

304
302
This text is English?
306
308
310
Search
Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M ! , ? .
.?123
.?123

FIG. 3

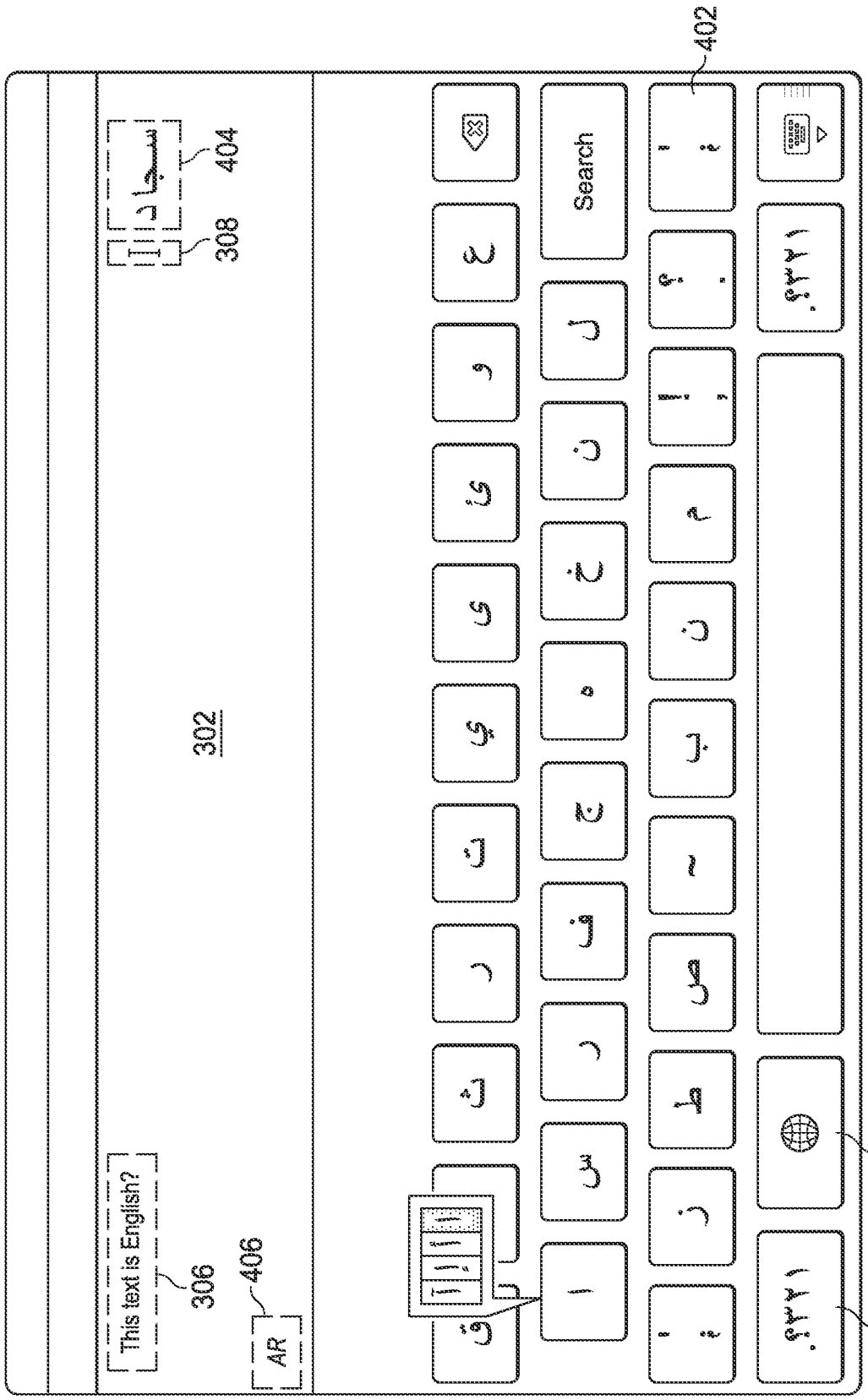

This text is English?
306
AR
406
302
سجاد
308
404
402
Search
408
310

FIG. 4

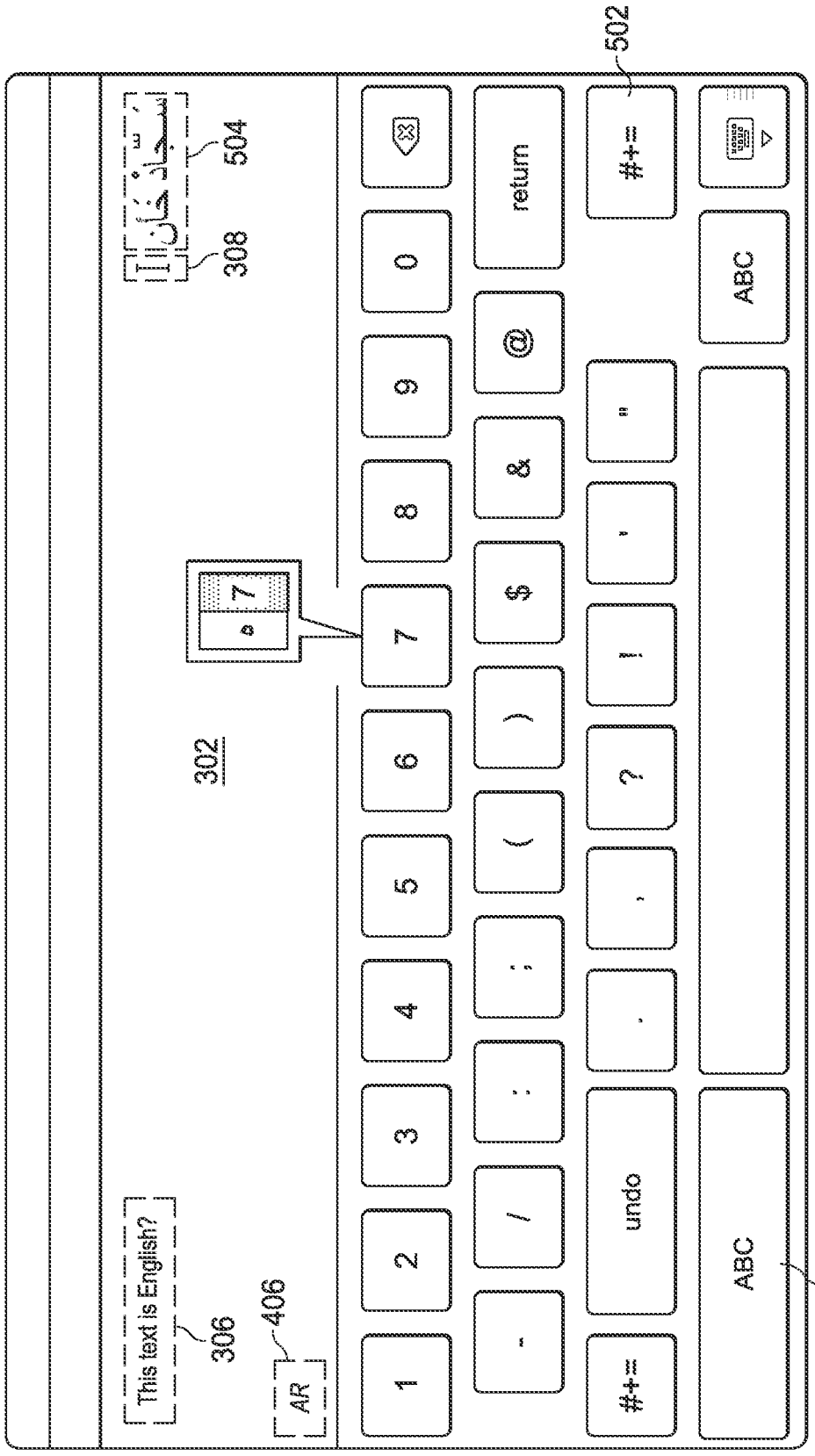

This text is English?
306
AR
406
302
7
٧
1
2
3
4
5
6
7
8
9
0
-
/
:
;
(
)
$
&
@
return
#+=
undo
.
,
?
!
'
"
#+=
ABC
ABC
506
502
اسجاد خان
504
308

FIG. 5

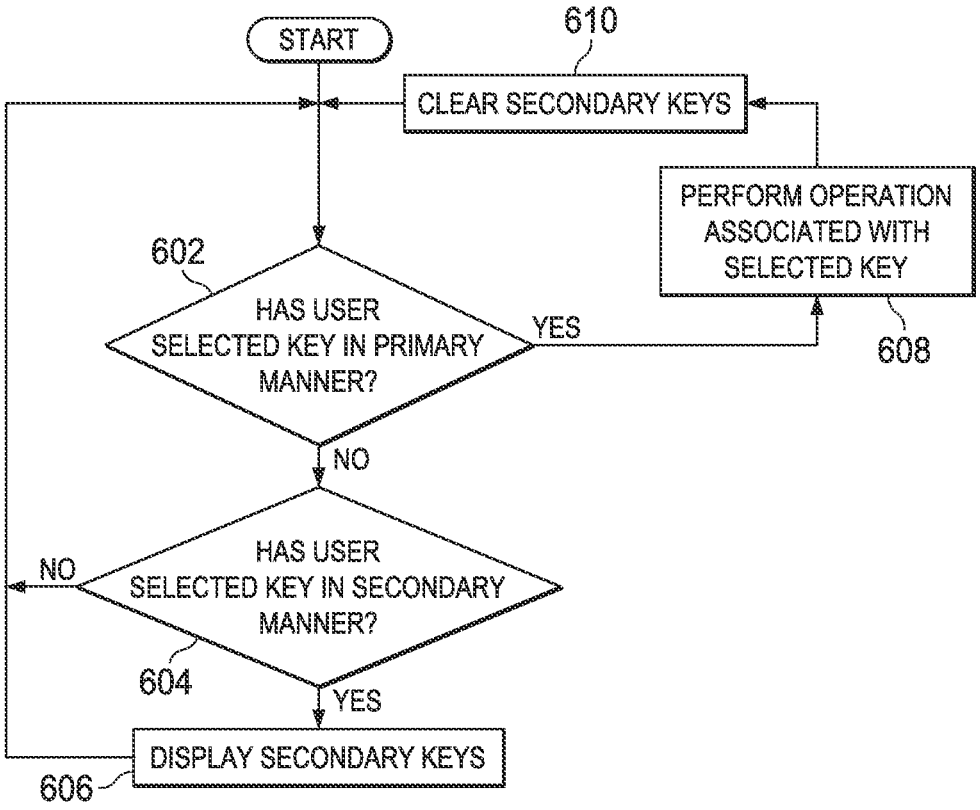

START
610
CLEAR SECONDARY KEYS
PERFORM OPERATION ASSOCIATED WITH SELECTED KEY
608
602
HAS USER SELECTED KEY IN PRIMARY MANNER?
YES
NO
HAS USER SELECTED KEY IN SECONDARY MANNER?
NO
604
YES
DISPLAY SECONDARY KEYS
606

FIG. 6

METHOD, SYSTEM AND COMPUTER PROGRAM PRODUCT FOR OPERATING A KEYBOARD

CROSS-REFERENCE TO RELATED APPLICATION

This application claims priority to U.S. Provisional Patent Application Ser. No. 61/623,616, filed Apr. 13, 2012, entitled ARABIC KEYBOARD MAPPINGS FOR TI-NSPIRE CX HANDHELD, naming Sajjad Mahmood Khan as inventor, which is hereby fully incorporated herein by reference for all purposes.

BACKGROUND

The disclosures herein relate in general to information handling systems, and in particular to a method, system and computer program product for operating a keyboard.

For composing and revising (e.g., typing) Arabic letters on an electronics device, a conventional user interface may be relatively cumbersome. Such interface may be even more cumbersome for composing and revising multilingual combinations of alphanumeric characters on the electronics device, such as combinations of Latin letters, other Latin characters (e.g., numbers), Arabic letters and other Arabic characters.

SUMMARY

In response to a user selecting a key on a keyboard in a first manner, a first alphanumeric character is displayed on a display device. In response to the user selecting the key on the keyboard in a second manner, a virtual key of a diacritic is displayed on the display device. In response to the user selecting the virtual key of the diacritic on the display device, the diacritic is displayed at a location of a second alphanumeric character on the display device.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a top view of an information handling system of the illustrative embodiments.

FIG. **2** is a block diagram of the system of FIG. **1**.

FIG. **3** is a diagram of a first example screen that is displayed by a display device of the system of FIG. **1**.

FIG. **4** is a diagram of a second example screen that is displayed by the display device of the system of FIG. **1**.

FIG. **5** is a diagram of a third example screen that is displayed by the display device of the system of FIG. **1**.

FIG. **6** is a flowchart of an operation of the system of FIG. **1**.

DETAILED DESCRIPTION

FIG. **1** is a top view of an information handling system (e.g., a portable handheld electronics device, such as a tablet computing device, a mobile smartphone, a netbook computer, a laptop computer, or a graphing calculator), indicated generally at **100**, of the illustrative embodiments. Accordingly, the system **100** executes various processes and performs operations (e.g., processing, displaying and otherwise communicating information) in response thereto. The system **100** includes a display device **102** for displaying and receiving information.

FIG. **2** is a block diagram of the system **100**. The system **100** includes various electronic circuitry components for

performing the system **100** operations, implemented in a suitable combination of software, firmware and hardware. Such components include: (a) a processor **202**, which is a general purpose computational resource for executing instructions of computer-readable software programs to process data (e.g., a database of information) and perform additional operations (e.g., communicating information) in response thereto; (b) a network interface unit **204** for communicating information to and from a network; (c) a computer-readable medium **206** for storing information, such as a nonvolatile storage device and/or a random access memory ("RAM") device; (d) a battery **208**, which is a source of power for the system **100**; (e) the display device **102** for displaying information to a human user **210** and for receiving information from the user **210**; and (f) other electronic circuitry for performing additional operations. In the illustrative embodiments, the various electronic circuitry components of the system **100** are housed integrally with one another.

Accordingly, the system **100** performs its operations in response to instructions of computer-readable software programs, which are stored on the computer-readable medium **206**. Such programs include, but are not limited to: (a) applications, such as applications for word processing, calculator, data collection, lists, statistics, graphing, geometry, querying, polling (e.g., quick polling), and various other functions; (b) a window, dialog and event manager; (c) a settings manager; (d) a power manager; (e) a communication stack; (f) a display driver; (g) a touchpad driver; (h) a universal serial bus ("USB") interface driver; (i) a wireless interface driver; and (j) boot code. Also, the computer-readable medium **206** stores data that are processed by the processor **202**, in response to the processor **202** executing such programs.

As shown in FIG. **1**, the processor **202** is connected to the display device **102**, the computer-readable medium **206**, and the battery **208**. For clarity, although FIG. **1** shows the battery **208** connected to only the processor **202**, the battery **208** is further coupled to various other components of the system **100**. Also, the processor **202** is coupled through the network interface unit **204** to the network (not shown in FIG. **1**), such as a Transport Control Protocol/Internet Protocol ("TCP/IP") network (e.g., the Internet or an intranet). For example, the network interface unit **204** communicates information by outputting information to, and receiving information from, the processor **202** and the network, such as by transferring information (e.g. instructions, data, signals) between the processor **202** and the network (e.g., wirelessly or through a USB interface).

The system **100** operates in association with the user **210**. In response to signals from the processor **202**, the display device **102** displays visual images, which represent information, so that the user **210** is thereby enabled to view the visual images. Also, in the illustrative embodiments, the display device **102** is a touchscreen, such as: (a) a liquid crystal display ("LCD") device; and (b) touch-sensitive circuitry of such LCD device, so that the touch-sensitive circuitry is integral with such LCD device. Accordingly, the user **210** operates the display device **102** (e.g., virtual keys thereof, such as a virtual keyboard and/or virtual keypad) for specifying information (e.g., alphanumeric text information) to the processor **202**, which receives such information from the display device **102**.

For example, referring also to FIG. **1**, the display device **102**: (a) detects presence and location of a physical touch (e.g., by a finger of the user **210**, and/or by a passive stylus object) within a display area of such touchscreen; and (b) in

response thereto, outputs signals (indicative of such detected presence and location) to the processor **202**. In that manner, the user **210** can physically touch (e.g., single tap, double tap, and/or press-and-hold) the display device **102** to: (a) select a portion (e.g., region) of a visual image that is then-currently displayed by the display device **102**; and/or (b) cause the display device **102** to output various information to the processor **202**. Accordingly: (a) the processor **202** executes a computer-readable software program; (b) such program is stored on the computer-readable medium **206**; and (c) in response to instructions of such program, and in response to such physical touch, the processor **202** causes the display device **102** to display various screens.

FIG. **3** is a diagram of a first example screen that is displayed by the display device **102**. In the example of FIG. **3**: (a) the user **210** has physically touched (e.g., single tapped) a text portion **302** on the display device **102**; and (b) in response thereto, the processor **202** has caused the display device **102** to display a set of keys (e.g., a virtual keyboard) **304** associated with the selected text portion **302** for viewing (on the display device **102**) by the user **210**. The keys **304** (e.g., QWERTY keys) are suitable for the user **210** to operate (e.g., physically touch with single tap, double tap, and/or press-and-hold) in composing and revising (e.g., typing) alphanumeric text information **306** at a location of a cursor **308** within the text portion **302**.

In one example, the processor **202** causes the display device **102** to position the cursor **308** in response to a command from the user **210**, such as in response to: (a) the user **210** physically touching the text portion **302** on the display device **102**, so that the cursor **308** is positioned at a location of such physical touch; or (b) the user **210** operating a pointing device (e.g., mouse or stylus), so that the cursor **308** is positioned at a location specified by such pointing device. In response to the user **210** selecting (e.g., single tapping) one of the keys **304**, the system **100** performs a respective operation associated with the selected key. In that manner, the user **210** operates the keys **304** for specifying information to the processor **202**, which: (a) receives such information from the display device **102**; and (b) in response thereto, causes the display device **102** to update the displayed screen in accordance with such information, and causes the computer-readable medium **206** to store a record of such update.

FIG. **4** is a diagram of a second example screen that is displayed by the display device **102**. In the example of FIG. **4**: (a) the user **210** has selected (e.g., single tapped) a special purpose key **310** within the keys **304** (FIG. **3**) on the display device **102**; and (b) in response thereto, the processor **202** has caused the display device **102** to display an alternative set of keys (e.g., an alternative virtual keyboard) **402** associated with the selected text portion **302** for viewing (on the display device **102**) by the user **210**, instead of displaying the set of keys **304**. The keys **402** are suitable for the user **210** to operate in composing and revising alphanumeric text information **404** at the location of the cursor **308** within the text portion **302**. In this example, the alphanumeric text information **404** includes Arabic letters and other Arabic characters (composed in a right-to-left order and revised by the user **210** suitably operating the keys **402**), while the alphanumeric text information **306** includes Latin letters and other Latin characters (composed in a left-to-right order and revised by the user **210** suitably operating the keys **304**).

As shown in FIGS. **3** and **4**, and in the first and second rows of Tables 1 and 2, each Arabic letter has a respective location (within the keys **402**) that aligns with a respective location (within the keys **304**) of such Arabic letter's phonetically similar Latin letter. For example: (a) the Arabic letter Ba (ب) has a respective location (within the keys **402**) that aligns with a respective location (within the keys **304**) of the Latin letter B; and (b) the Arabic letter Fa (ف) has a respective location (within the keys **402**) that aligns with a respective location (within the keys **304**) of the Latin letter F. In that manner, the system **100** helps the user **210** to learn similarities (e.g., in pronunciation) between Latin letters and their phonetically similar Arabic letters.

TABLE 1

Phonetic Mapping between Latin Letters (A through N) and Arabic Letters

A	B	C	D	E	F	G	H	I	J	K	L	M	N
أ إ آ	ب	ص ض	د ذ	ث	ف	ج ح	ه	ى ي	خ	ك	ل	م	ن

TABLE 2

Phonetic Mapping between Latin Letters (O through Z) and Arabic Letters

O	P	Q	R	S	T	U	V	W	X	Y	Z
و	ع غ	ق	ر	س ش	ت ة	ى	ے	ؤ	ط ظ	ي	ز

As shown in the third rows of Tables 1 and 2, the system **100** associates some Arabic letters (within the keys **402**) with related Arabic letters. For example, the system **100** associates: (a) the Arabic letter ا with the related Arabic letters أ, إ and آ (b) the Arabic letter ص with the related Arabic letter ض; (c) the Arabic letter د with the related Arabic letter ذ· (d) the Arabic letter س with the related Arabic letter ش and (e) the Arabic letter ط with the related Arabic letter ظ. In that manner, the system **100** helps the user **210** to learn similarities between an Arabic letter and its related Arabic letter(s).

In response to the user **210** pressing-and-holding one of the Arabic letters (within the keys **402**) that the system **100** associates with one or more related Arabic letters, the processor **202** causes the display device **102** to display virtual key(s) of such related Arabic letter(s), so that such display is viewable by the user **210** with more efficiency and comfort (instead of displaying all of the related Arabic letters from the third rows of Tables 1 and 2 simultaneously with one another). In the example of FIG. **4**: (a) the user **210** has pressed-and-held the Arabic letter ا key on the display device **102**; and (b) in response thereto, the processor **202** has caused the display device **102** to display (adjacent to the Arabic letter ا key) virtual keys of the related Arabic letters أ, إ and آ for viewing (on the display device **102**) by the user **210**. The user **210** is able to select (e.g., single tap) any of the keys **402**, including any displayed virtual key(s) of such related Arabic letter(s). In response to such selection by the user **210**, the processor **202** causes the display device **102** to display the selected key's Arabic letter at the location of the cursor **308** within the text portion **302**.

As shown in FIGS. **3** and **4**, the processor **202** causes the display device **102** to display the special purpose key **310** within the keys **304** and within the keys **402**. In response to the user **210** selecting (e.g., single tapping) the special purpose key **310** within the keys **402** (FIG. **4**) on the display device **102**, the processor **202** causes the display device **102**

to again display the set of keys **304** (FIG. **3**) for viewing (on the display device **102**) by the user **210**, instead of displaying the set of keys **402**. Accordingly, by repeatedly selecting the special purpose key **310**, the user **210** causes the display device **102** to alternate between displaying either the set of keys **304** or the set of keys **402** for viewing (on the display device **102**) by the user **210**, while continuing to display (within the text portion **302**) the alphanumeric text information **306** and **404** irrespective of such repeated selection. In that manner: (a) by alternating between the sets of keys **304** and **402**, those keys are suitable for the user **210** to operate in composing and revising multilingual combinations of Latin letters, other Latin characters, Arabic letters and other Arabic characters; and (b) in response to such operation, the processor **202** causes the display device **102** to simultaneously display such multilingual combinations (e.g., the alphanumeric text information **306** and **404**) within the text portion **302**, as shown in the example of FIG. **4**.

In an alternative embodiment: (a) the keys **304** are implemented by a physical (instead of virtual) keyboard; and (b) by repeatedly selecting (e.g., single tapping) the special purpose key **310**, the user **210** causes the system **100** to alternate between a Latin mode and an Arabic mode. In the Latin mode, the keys **304** perform the same functions as discussed hereinabove in connection with FIG. **3**, so that the keys **304** are suitable for the user **210** to operate in composing and revising Latin letters and other Latin characters within the text portion **302**. By comparison, in the Arabic mode (e.g., which the system **100** may indicate by displaying an "Arabic mode" icon **406** within the text portion **302**) of such alternative embodiment, the keys **304** perform the same functions as their phonetically similar keys **402** respectively (as shown in the first and second rows of Tables 1 and 2), so that the keys **304** are suitable for the user **210** to operate in: (a) composing and revising Arabic letters and other Arabic characters within the text portion **302**; and (b) in response to the user **210** pressing-and-holding one of the keys **304**, causing the display device **102** to display (within the text portion **302**) virtual key(s) of related Arabic letter(s) as shown in the third rows of Tables 1 and 2, but without displaying the other keys **402** to the user **210**. In that manner: (a) by alternating between the Latin mode and the Arabic mode, the keys **304** and the displayed virtual key(s) of such related Arabic letter(s) are suitable for the user **210** to operate in composing and revising multilingual combinations of Latin letters, other Latin characters, Arabic letters and other Arabic characters; and (b) in response to such operation, the processor **202** causes the display device **102** to simultaneously display such multilingual combinations within the text portion **302**.

FIG. **5** is a diagram of a third example screen that is displayed by the display device **102**. In the example of FIG. **5**: (a) the user **210** has selected (e.g., single tapped) a numeric mode key **408** within the keys **402** (FIG. **4**) on the display device **102**; and (b) in response thereto, the processor **202** has caused the display device **102** to display an alternative set of keys (e.g., an alternative virtual keyboard) **502** associated with the selected text portion **302** for viewing (on the display device **102**) by the user **210**, instead of displaying the set of keys **402**. The keys **502** are suitable for the user **210** to operate in composing and revising alphanumeric text information **504** at the location of the cursor **308** within the text portion **302**. In this example, the alphanumeric text information **504** includes Arabic letters and other Arabic characters (composed in a right-to-left order and revised by the user **210** suitably operating the keys **402** and **502**), while the alphanumeric text information **306** includes Latin letters and other Latin characters (composed in a left-to-right order and revised by the user **210** suitably operating the keys **304**).

As shown in the Table 3, the system **100** associates numbers (within the keys **502**) with diacritics.

TABLE 3

Mapping between Numbers and Diacritics

1	2	3	4	5	6	7	8	9	0
◌ً	◌ٌ	◌ٍ	◌َ	◌ُ	◌ِ	◌ْ	◌ّ	◌ٓ	◌ٔ

In response to the user **210** pressing-and-holding one of the numbers (within the keys **502**), the processor **202** causes the display device **102** to display virtual key(s) of such associated diacritic(s), so that such display is viewable by the user **210** with more efficiency and comfort (instead of displaying all of the diacritics from the second row of Table 3 simultaneously with one another). In the example of FIG. **5**: (a) the user **210** has pressed-and-held the number 7 key on the display device **102**; and (b) in response thereto, the processor **202** has caused the display device **102** to display (adjacent to the number 7 key) a virtual key of the associated diacritic ◌ْ for viewing (on the display device **102**) by the user **210**. The user **210** is able to select (e.g., single tap) any of the keys **502**, including any displayed virtual key(s) of such associated diacritic(s). In response to such selection (by the user **210**) of a diacritic's displayed virtual key, the processor **202** causes the display device **102** to display such diacritic at the location of the Arabic letter that is adjacent a right side of the cursor **308** within the text portion **302**.

In response to the user **210** selecting (e.g., single tapping) an alphabetic mode key **506** within the keys **502** on the display device **102**, the processor **202** causes the display device **102** to again display the set of keys **402** (FIG. **4**) for viewing (on the display device **102**) by the user **210**, instead of displaying the set of keys **502**. Accordingly, by repeatedly selecting the numeric mode key **408** (FIG. **4**) and the alphabetic mode key **506** (FIG. **5**), the user **210** causes the display device **102** to alternate between displaying either the set of keys **402** or the set of keys **502** for viewing (on the display device **102**) by the user **210**, while continuing to display (within the text portion **302**) the alphanumeric text information **306** and **504** irrespective of such repeated selection. In that manner: (a) by alternating between the sets of keys **402** and **502**, those keys are suitable for the user **210** to operate in composing and revising combinations of Arabic letters, diacritics and other characters; and (b) in response to such operation, the processor **202** causes the display device **102** to simultaneously display such combinations (e.g., the alphanumeric text information **504**) within the text portion **302**, as shown in the example of FIG. **5**.

In an alternative embodiment: (a) the keys **502**, in combination with the keys **304** (FIG. **3**), are implemented by a physical (instead of virtual) keyboard; and (b) by repeatedly selecting (e.g., single tapping) the special purpose key **310** (FIG. **3**), the user **210** causes the system **100** to alternate between a Latin mode and an Arabic mode. In the Latin mode, the keys **502** perform their conventional functions, so that the keys **502** are suitable for the user **210** to operate in composing and revising numbers and other characters within the text portion **302**. By comparison, in the Arabic mode (e.g., which the system **100** may indicate by displaying the "Arabic mode" icon **406** within the text portion **302**) of such alternative embodiment, numbered ones of the keys **502**

perform their conventional functions and the diacritic functions as shown in Table 3, so that such numbered ones of the keys **502** are suitable for the user **210** to operate in: (a) composing and revising diacritics at Arabic letters within the text portion **302**; and (b) in response to the user **210** pressing-and-holding a numbered one of the keys **502**, causing the display device **102** to display (within the text portion **302**) virtual key(s) of associated diacritic(s) as shown in Table 3. In that manner: (a) by alternating between the Latin mode and the Arabic mode, the keys **502** and the displayed virtual key(s) of such associated diacritic(s) are suitable for the user **210** to operate in composing and revising combinations of numbers, diacritics at Arabic letters, and other characters; and (b) in response to such operation, the processor **202** causes the display device **102** to simultaneously display such combinations within the text portion **302**.

FIG. **6** is a flowchart of an operation of the system **100**. Such operation is discussed hereinabove in connection with FIGS. **4** and **5**. At a step **602**, the system **100** determines whether the user **210** has selected a key in a primary manner (e.g., selecting a key by single tapping such key).

In response to the system **100** determining (at the step **602**) that the user **210** has not selected a key in the primary manner, the operation continues from the step **602** to a step **604**. At the step **604**, the system **100** determines whether the user **210** has selected a key in a secondary manner (e.g., selecting a key by pressing-and-holding such key). In response to the system **100** determining (at the step **604**) that the user **210** has not selected a key in the secondary manner, the operation returns from the step **604** to the step **602**.

Conversely, in response to the system **100** determining (at the step **604**) that the user **210** has selected a key in the secondary manner, the operation continues from the step **604** to a step **606**. At the step **606**, the processor **202** causes the display device **102** to display one or more secondary keys (if any) that are associated with the selected key. After the step **606**, the operation returns to the step **602**.

In a first example of the step **606**, as discussed hereinabove in connection with FIG. **4**, if the selected key is an Arabic letter (within the keys **402**) that the system **100** associates with one or more related Arabic letters (as shown in the third rows of Tables 1 and 2), then such one or more secondary keys would be virtual key(s) of such related Arabic letter(s). In a second example of the step **606**, as discussed hereinabove in connection with FIG. **5**, if the selected key is a number (within the keys **502**), then such one or more secondary keys would be virtual key(s) of diacritic(s) that the system **100** associates with such number (as shown in Table 3).

Referring again to the step **602**, in response to the system **100** determining that the user **210** has selected a key (e.g., any of the displayed secondary keys) in the primary manner, the operation continues from the step **602** to a step **608**. At the step **608**, the system **100** performs a respective operation associated with the selected key. After the step **608**, the operation continues to a step **610**, at which the processor **202** causes the display device **102** to clear (e.g., erase) its display of secondary keys (if any), which may have been displayed by the display device **102** as a result of the step **606**. After the step **610**, the operation returns to the step **602**.

In a first example of the step **608**, as discussed hereinabove in connection with FIG. **4**, if the selected key is an Arabic letter (as shown in the second or third rows of Tables 1 and 2), then the processor **202** causes the display device **102** to display the selected key's Arabic letter at the location of the cursor **308** within the text portion **302**, so that such displaying is the respective operation associated with the selected key. In a second example of the step **608**, as discussed hereinabove in connection with FIG. **5**, if the selected key is a diacritic (as shown in the second row of Table 3), then the processor **202** causes the display device **102** to display such diacritic at the location of the Arabic letter that is adjacent a right side of the cursor **308** within the text portion **302**, so that such displaying is the respective operation associated with the selected key.

In the illustrative embodiments, a computer program product is an article of manufacture that has: (a) a computer-readable medium; and (b) a computer-readable program that is stored on such medium. Such program is processable by an instruction execution apparatus (e.g., system or device) for causing the apparatus to perform various operations discussed hereinabove (e.g., discussed in connection with a block diagram). For example, in response to processing (e.g., executing) such program's instructions, the apparatus (e.g., programmable information handling system) performs various operations discussed hereinabove. Accordingly, such operations are computer-implemented.

Such program (e.g., software, firmware, and/or microcode) is written in one or more programming languages, such as: an object-oriented programming language (e.g., C++); a procedural programming language (e.g., C); and/or any suitable combination thereof. In a first example, the computer-readable medium is a computer-readable storage medium. In a second example, the computer-readable medium is a computer-readable signal medium.

A computer-readable storage medium includes any system, device and/or other non-transitory tangible apparatus (e.g., electronic, magnetic, optical, electromagnetic, infrared, semiconductor, and/or any suitable combination thereof) that is suitable for storing a program, so that such program is processable by an instruction execution apparatus for causing the apparatus to perform various operations discussed hereinabove. Examples of a computer-readable storage medium include, but are not limited to: an electrical connection having one or more wires; a portable computer diskette; a hard disk; a random access memory ("RAM"); a read-only memory ("ROM"); an erasable programmable read-only memory ("EPROM" or flash memory); an optical fiber; a portable compact disc read-only memory ("CD-ROM"); an optical storage device; a magnetic storage device; and/or any suitable combination thereof.

A computer-readable signal medium includes any computer-readable medium (other than a computer-readable storage medium) that is suitable for communicating (e.g., propagating or transmitting) a program, so that such program is processable by an instruction execution apparatus for causing the apparatus to perform various operations discussed hereinabove. In one example, a computer-readable signal medium includes a data signal having computer-readable program code embodied therein (e.g., in baseband or as part of a carrier wave), which is communicated (e.g., electronically, electromagnetically, and/or optically) via wireline, wireless, optical fiber cable, and/or any suitable combination thereof.

Although illustrative embodiments have been shown and described by way of example, a wide range of alternative embodiments is possible within the scope of the foregoing disclosure.

What is claimed is:

1. A method performed by at least one device for operating a keyboard, the method comprising:

in response to a user selecting a first key on the keyboard in a first manner, displaying a first alphanumeric character on a display device;

in response to the user selecting a second key on the keyboard in the first manner, displaying a second alphanumeric character at a location on the display device, wherein the second alphanumeric character is a first Arabic letter;

in response to the user selecting the first key on the keyboard in a second manner, displaying a virtual key of a first diacritic on the display device;

in response to the user selecting the virtual key of the first diacritic on the display device, displaying the first diacritic at the location of the second alphanumeric character on the display device;

in response to the user selecting the second key on the keyboard in the second manner, displaying at least one virtual key of at least one second Arabic letter on the display device, wherein the at least one second Arabic letter includes a second diacritic and is related to the first Arabic letter; and

in response to the user selecting the at least one virtual key of the at least one second Arabic letter on the display device, displaying the at least one second Arabic letter on the display device.

2. The method of claim **1**, wherein the keyboard is a virtual keyboard.

3. The method of claim **1**, wherein the first manner is a single tap.

4. The method of claim **1**, wherein the second manner is a press-and-hold.

5. The method of claim **1**, wherein the first alphanumeric character is a numeric character.

6. The method of claim **1**, wherein displaying the first diacritic at the location of the second alphanumeric character includes:

in response to the user selecting the virtual key of the first diacritic on the display device in the first manner, displaying the first diacritic at the location of the second alphanumeric character on the display device.

7. The method of claim **1**, wherein the location of the second alphanumeric character on the display device is indicated by a cursor that is positioned in response to a command from the user.

8. A computer program product for operating a keyboard, the computer program product comprising:

a non-transitory computer-readable storage medium; and

a computer-readable program stored on the non-transitory computer-readable storage medium, wherein the computer-readable program is processable by an information handling system for causing the information handling system to perform operations including: in response to a user selecting a first key on the keyboard in a first manner, displaying a first alphanumeric character on a display device; in response to the user selecting a second key on the keyboard in the first manner, displaying a second alphanumeric character at a location on the display device, wherein the second alphanumeric character is a first Arabic letter; in response to the user selecting the first key on the keyboard in a second manner, displaying a virtual key of a first diacritic on the display device; in response to the user selecting the virtual key of the first diacritic on the display device, displaying the first diacritic at the location of the second alphanumeric character on the display device; in response to the user selecting the second key on the keyboard in the second manner, displaying at least one virtual key of at least one second Arabic letter on the display device, wherein the at least one second Arabic letter includes a second diacritic and is related to the first Arabic letter; and, in response to the user selecting the at least one virtual key of the at least one second Arabic letter on the display device, displaying the at least one second Arabic letter on the display device.

9. The computer program product of claim **8**, wherein the keyboard is a virtual keyboard.

10. The computer program product of claim **8**, wherein the first manner is a single tap.

11. The computer program product of claim **8**, wherein the second manner is a press-and-hold.

12. The computer program product of claim **8**, wherein the first alphanumeric character is a numeric character.

13. The computer program product of claim **8**, wherein displaying the first diacritic at the location of the second alphanumeric character includes:

in response to the user selecting the virtual key of the first diacritic on the display device in the first manner, displaying the first diacritic at the location of the second alphanumeric character on the display device.

14. The computer program product of claim **8**, wherein the location of the second alphanumeric character on the display device is indicated by a cursor that is positioned in response to a command from the user.

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